



NAVAL OCEANOGRAPHIC OFFICE

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NAVOCEANO Core Capabilities

The Naval Oceanographic Office (NAVOCEANO) is located at the John C. Stennis Space Center near the Mississippi Gulf Coast. The Command is responsible for providing oceanographic products and services to all elements of the Department of Defense (DOD).

NAVOCEANO employs nearly 1,100 civilian, military and contractor personnel educated in the fields of oceanography, hydrography, bathymetry, acoustics, geophysics and engineering. More oceanographers work at Stennis Space Center than any other place in the world.

NAVOCEANO uses a variety of platforms, such as survey ships, hydrographic survey launches (HSLs), satellite sensors and buoys, to collect oceanographic and hydrographic data from the world's oceans. The data are then analyzed and utilized in products that support the warfighter.

DATA COLLECTION RESOURCES

- *Ships.* NAVOCEANO has technical control of six 329-foot-long, 5,000-ton T-AGS 60 class ships and one hydrographic ship designed to provide multipurpose oceanographic capabilities in coastal and deep-ocean areas. These include physical, chemical and biological oceanography; multidiscipline environmental investigations; ocean engineering and marine acoustics; marine geology and geophysics; and bathymetric, gravimetric and magnetometric surveying. Three of the ships can accommodate two HSLs each.
- *HSLs.* NAVOCEANO HSLs support and enhance the data collection efforts of the T-AGS ships. Launched from the ships, the HSLs conduct surveys in shallow-water areas where the T-AGS ships cannot go. These 34-foot-long HSLs are equipped with side-scan sonar, multibeam echosounder, Global Positioning System, an Integrated Survey System and other capabilities and can work in three meters of water.
- *Buoys.* NAVOCEANO uses several types of buoys. Moored buoys collect meteorological data such as wind speed and direction, barometric pressure and air temperature, and oceanographic data such as current speed and direction, water temperature and water salinity. In addition, specialized buoys are deployed from T-AGS 60 class ships to collect long-range/broadband acoustic data used to predict long-range acoustic propagation.

Drifting buoys are used to collect similar data but are pushed around by winds and tides. Data are assimilated into models to provide predictions to the Navy fleet. Some buoys transmit data via satellite so NAVOCEANO can provide the fleet with real-time or near-real-time measurements.

- *Subsurface Autonomous Mapping System (SAMS).* Designed to augment ship capabilities, SAMS is a free-swimming, programmable, redirectable autonomous underwater vehicle that performs independent physical oceanographic data collections and side-scan sonar bottom-mapping surveys. SAMS II is equipped with optics and acoustic packages, including dual-frequency side-scan sonar.
- *Environmental Acoustic Recording System (EARS).* EARS is an autonomous, battery-powered, full-ocean-depth, acoustic recording system that records omnidirectional ocean acoustic ambient noise.
- *Compact Hydrographic Airborne Rapid Total Survey (CHARTS).* Aircraft can cover large ocean areas and, unlike ships, quickly assimilate a synoptic snapshot of many parameters for broad areas. CHARTS, installed aboard an aircraft, currently represents the latest airborne charting and mapping technology, integrating a 1,000-Hz hydrographic LIDAR, a 10,000-Hz topographic Lidar and digital imaging capability into one compact unit.
- *Through-the-Sensor Data Collection.* In addition to organic "White Ship" data collection capabilities, NAVOCEANO leverages Navy fleet or "Grey" surface, subsurface and air data collection opportunities from tactical sensors. Sensors include AN/AQS-14/20 Mine-Hunting Sonar, SQS-53C Active ASW Sonar, UQN-4 and BQN-17 Echosounders and BQQ-10 Sail Array Sonar. These data are used for on-scene Environmental Intelligence Battlespace Preparation and databased for use in strategic and operational planning via standard delivery mechanisms.

SUPPORT

- *Warfighting Support Center (WSC).* The WSC provides analyses and characterizations of the littoral and riverine battlespace for worldwide expeditionary and special forces. Services include imagery analysis and explanation, text and graphical environmental summa-

ry reports and delivery of geospatial products through Web-based systems. WSC products include satellite images overlain with nearshore bathymetry and indications of obstacles, text reports on the climatological nearshore current conditions and riverine studies indicating potential or hazardous crossing points.

- *Survey Operations Center (SOC)*. Through the use of C/Ku bandwidth communications systems on some T-AGS 60 ships, the SOC receives data in a 1-Mb/second ship-to-shore capacity. The SOC receives physical oceanography, bathymetric and side-scan sonar data from the ship via the C/Ku system to review for quality assurance. The SOC plans to outfit all the T-AGS 60 ships with this technology by 2005. Eventually, this is how data ingest will be completed for all surveys.

- *Littoral Warfare Team*. NAVOCEANO's Littoral Warfare Team is a rapid-response military team with capabilities to conduct hydrographic surveys within two to three days. The team can perform quick-turnaround surveys anywhere in the world to provide timely products to the warfighter. The on-scene data collected and processed by the team provide the Navy with the best graphic depictions of potential hazards to navigation. The Bottom Mapping Team, comprised of civilian and military personnel, uses data from tactical mine-hunting sensors, including unmanned underwater vehicles; deploys with the mine countermeasure squadrons to characterize the littoral battlespace; and provides tactical support via technologies like change detection.

- *International Programs*. International Division personnel work with foreign country personnel to install hydrographic equipment aboard host-country boats of opportunity and conduct collaborative surveys under formal agreements, which allow NAVOCEANO and the host country to share data and products.

- *Partnerships*. NAVOCEANO partners with private industry, government organizations and academia to improve collection processing and validate data. Partners include NASA, NOAA, the National Geospatial-Intelligence Agency, U.S. Army Corps of Engineers, numerous universities and others.

DATA STORAGE RESOURCES

- *Major Shared Resource Center (MSRC)*. The NAVOCEANO MSRC for High Performance Computing (HPC) provides secure, fault-tolerant operation at multi-gigabit speeds. The MSRC is connected to government, industrial and academic networks worldwide

via its external Defense Research and Engineering Network wide-area connectivity. Computational resources within the MSRC include a balanced suite of some of the world's largest HPC systems that provides an aggregate peak computational capability exceeding 25 trillion operations per second. The MSRC's Remote Storage Facility stores and manages data archives that are thousands of terabytes in size and provides cutting-edge capabilities for disaster recovery, high performance data storage and long-term/high-volume data management.

- *Online*. Many NAVOCEANO products and services are available online at NAVOCEANO's Web site. The Data Warehouse stores NAVOCEANO data and is accessible via NAVOCEANO's Web site. Visitors can search, access and extract model or text data from various databases and libraries. Visitors can also view designated models, request specific information, access the Digital Bathymetric Database-Variable resolution or the Generalized Digital Environmental Model and download text and image files, all with a click of the button.

PRODUCTS AND SERVICES

- *Ocean Modeling*. NAVOCEANO provides tailored ocean modeled products to warfighters on local, regional and global scales. Products include 3D circulation models (featuring variable resolution to one-half kilometer); forecasts of salinity, currents, tides and temperatures; gridded sets of wave parameters; and conductivity, temperature and depth data.

- *Visualization/Imagery*. The MSRC's Visual Analysis and Data Interpretation Center merges advanced data visualization and analysis tools, techniques and an expert staff with one of the world's premier computing and data management environments. Scientists and engineers have the unique ability to analyze, interact and distill information from the vast amounts of computed and observed data managed within the MSRC.

- *GF MPL and OAML*. The Geophysics Fleet Mission Program Library (GF MPL), a software library, provides support for fleet, air, surface, amphibious and antisubmarine warfare planning and execution. The Oceanographic and Atmospheric Master Library (OAML) consists of Navy-standard core-models, algorithms and databases that support Navy, Joint and NATO activities and DOD R&D laboratories. NAVOCEANO updates, quality assures, establishes and disseminates new products to satisfy operational fleet objectives.

*For more information, please contact NAVOCEANO Public Affairs at 228.688.5649
or visit <https://www.navo.navy.mil>.*